FIG. 1

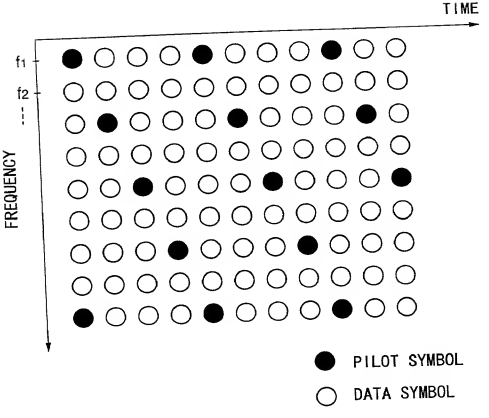


FIG.2

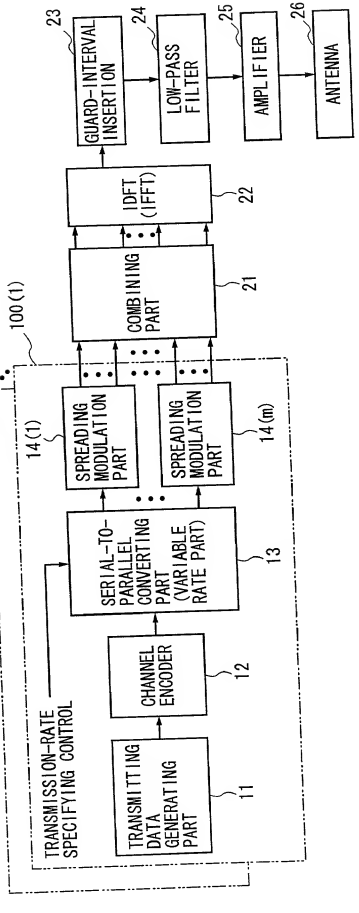

100 (n)
100 (1)
TRANSMISSION-RATE SPECIFYING CONTROL
TRANSMITTING DATA GENERATING PART
11
CHANNEL ENCODER
12
SERIAL-TO-PARALLEL CONVERTING PART (VARIABLE RATE PART)
13
14 (1)
SPREADING MODULATION PART
14 (m)
SPREADING MODULATION PART
COMBINING PART
21
IDFT (IFFT)
22
GUARD-INTERVAL INSERTION
23
LOW-PASS FILTER
24
AMPLIFIER
25
ANTENNA
26

FIG.3

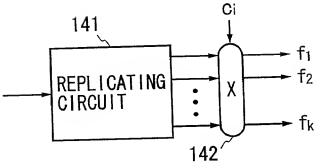

141
Ci
REPLICATING CIRCUIT
X
f_1
f_2
f_k
142

FIG.4

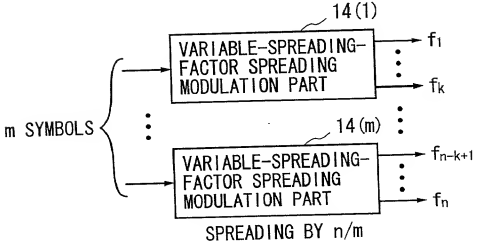

14(1)
VARIABLE-SPREADING-FACTOR SPREADING MODULATION PART
f_1
f_k
m SYMBOLS
14(m)
VARIABLE-SPREADING-FACTOR SPREADING MODULATION PART
f_{n-k+1}
f_n
SPREADING BY n/m

FIG.5A

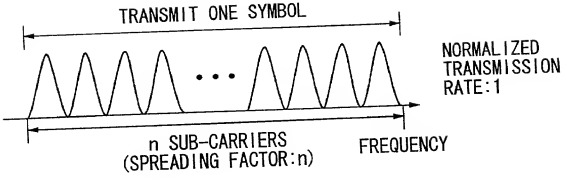

TRANSMIT ONE SYMBOL
NORMALIZED
TRANSMISSION
RATE:1
n SUB-CARRIERS
(SPREADING FACTOR:n)
FREQUENCY

FIG.5B

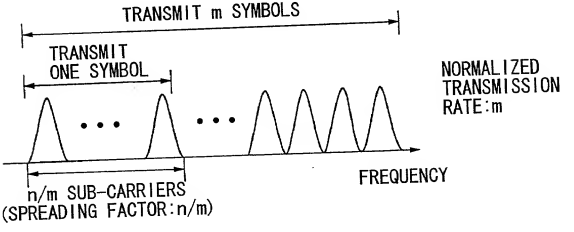
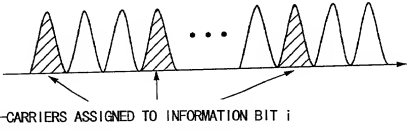

TRANSMIT m SYMBOLS
TRANSMIT
ONE SYMBOL
NORMALIZED
TRANSMISSION
RATE:m
FREQUENCY
n/m SUB-CARRIERS
(SPREADING FACTOR:n/m)

FIG. 6A

SUB-CARRIERS ASSIGNED TO INFORMATION BIT i

FIG. 6B


SUB-CARRIERS ASSIGNED TO INFORMATION BIT i

PATENT PUBLICATION

FIG. 7

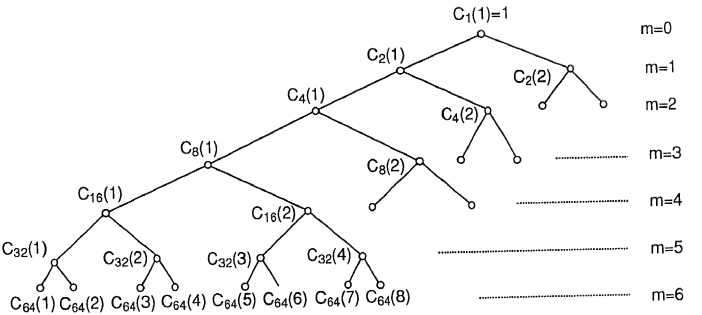


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FIG.8

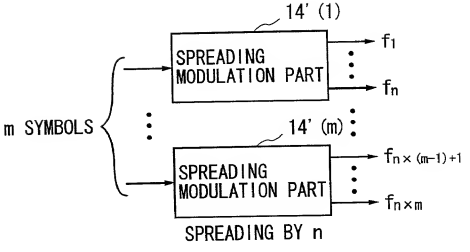
14' (1)
SPREADING MODULATION PART
f1
fn
m SYMBOLS
14' (m)
SPREADING MODULATION PART
fn×(m-1)+1
fn×m
SPREADING BY n

FIG.9A

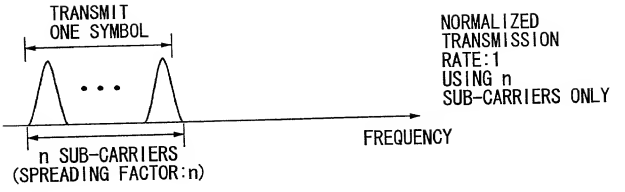
TRANSMIT
ONE SYMBOL
NORMALIZED
TRANSMISSION
RATE:1
USING n
SUB-CARRIERS ONLY
FREQUENCY
n SUB-CARRIERS
(SPREADING FACTOR:n)

FIG.9B

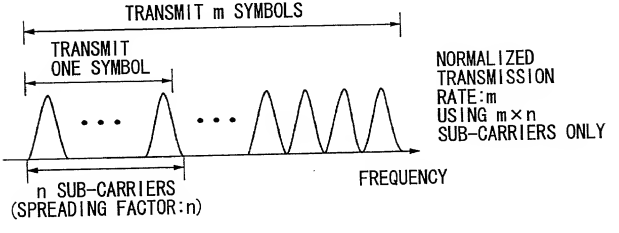
TRANSMIT m SYMBOLS
TRANSMIT
ONE SYMBOL
NORMALIZED
TRANSMISSION
RATE:m
USING m×n
SUB-CARRIERS ONLY
FREQUENCY
n SUB-CARRIERS
(SPREADING FACTOR:n)

FIG.10

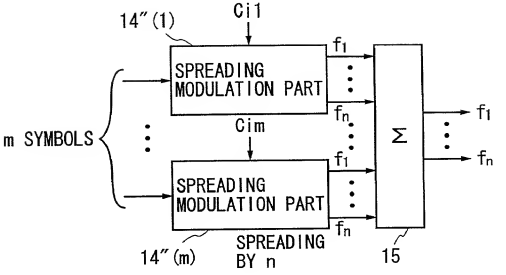
14″(1)
Ci1
SPREADING MODULATION PART
f1
fn
m SYMBOLS
Cim
SPREADING MODULATION PART
f1
fn
Σ
f1
fn
14″(m)
SPREADING BY n
15

FIG.11A

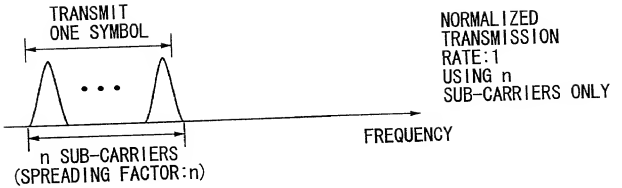

FIG.11B

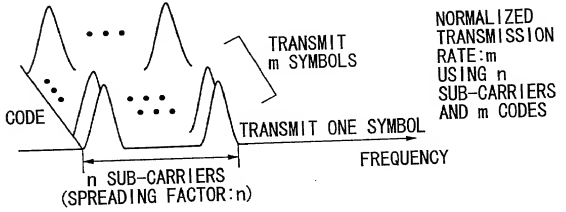

FIG.12

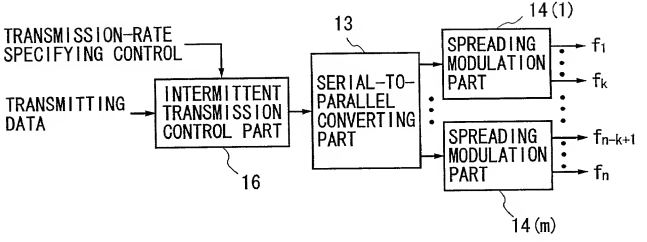

FIG.13A

FIG.13B

FIG.13C

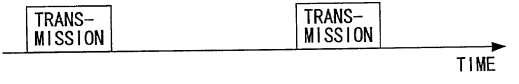

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FIG.14

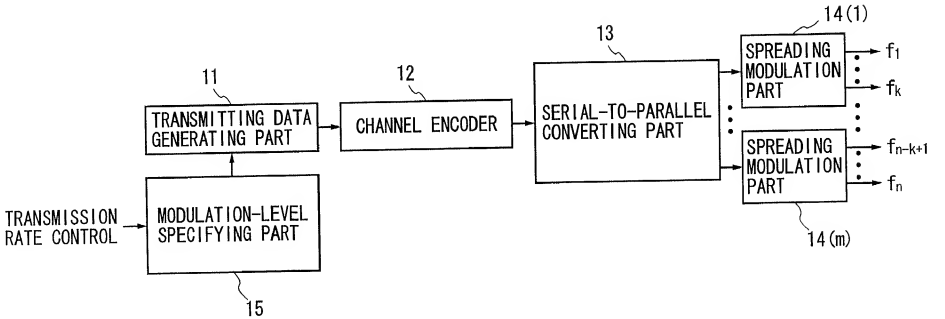


FIG. 15

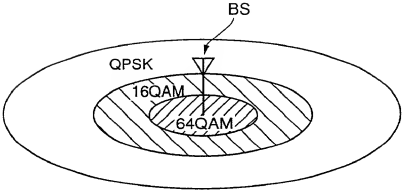


FIG. 16

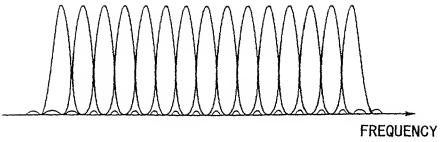
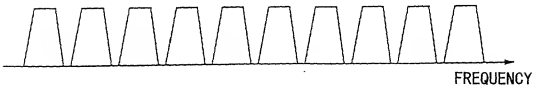


FIG. 17



FUJITSU 10508460

FIG.18

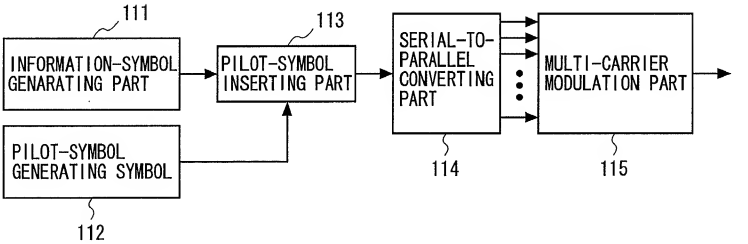


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FIG. 19

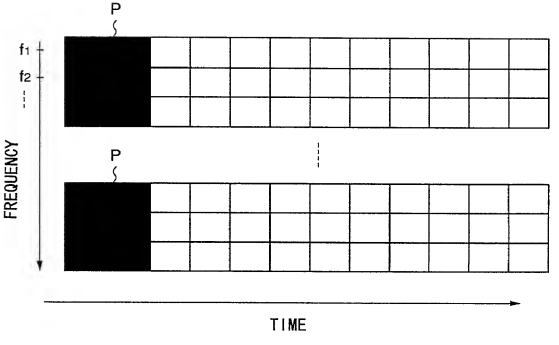


FIG. 20

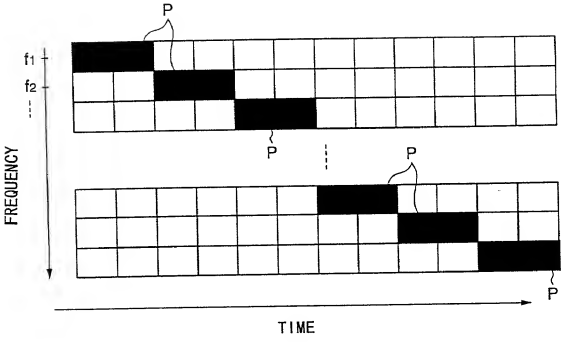

P
f1
f2
FREQUENCY
P
P
P
TIME

FIG.21

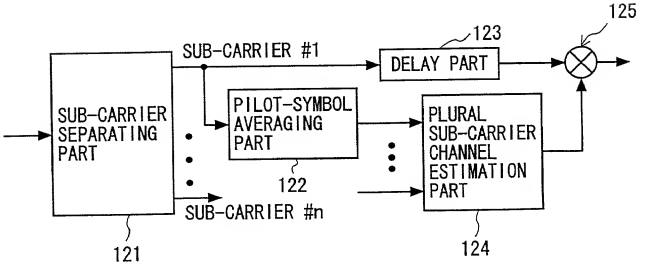
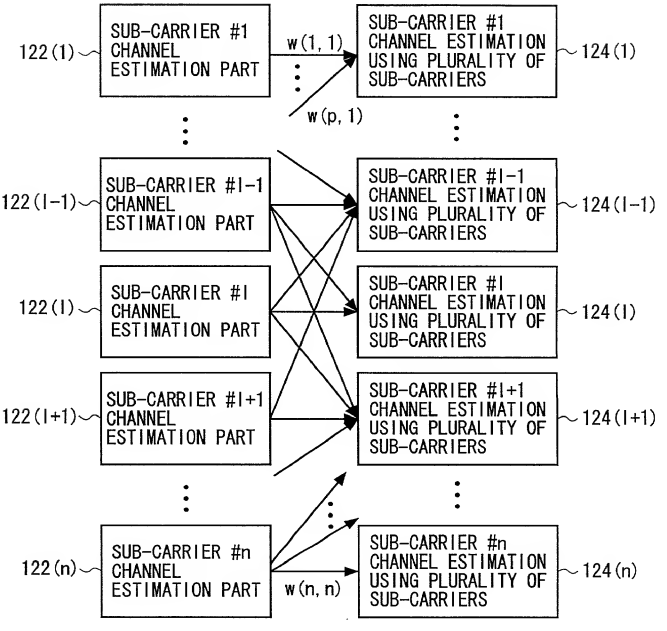

125
123
SUB-CARRIER #1
DELAY PART
SUB-CARRIER SEPARATING PART
PILOT-SYMBOL AVERAGING PART
PLURAL SUB-CARRIER CHANNEL ESTIMATION PART
122
SUB-CARRIER #n
121
124

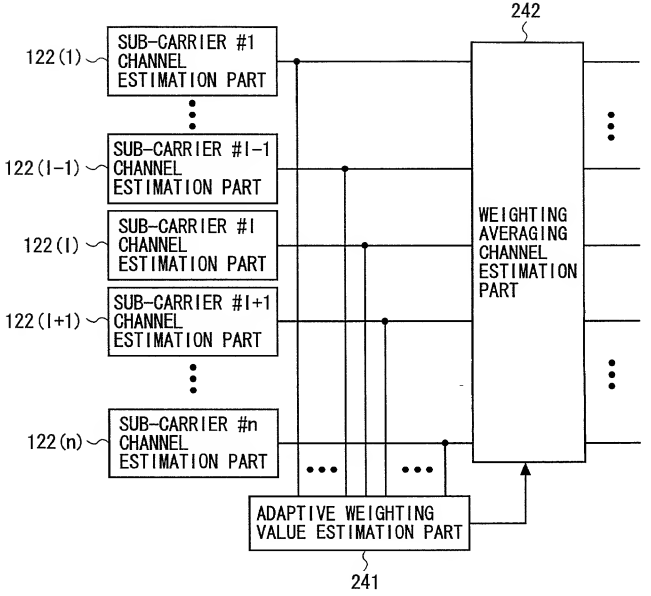
FIG.22



$$W \cdot \xi = \langle \xi \rangle$$

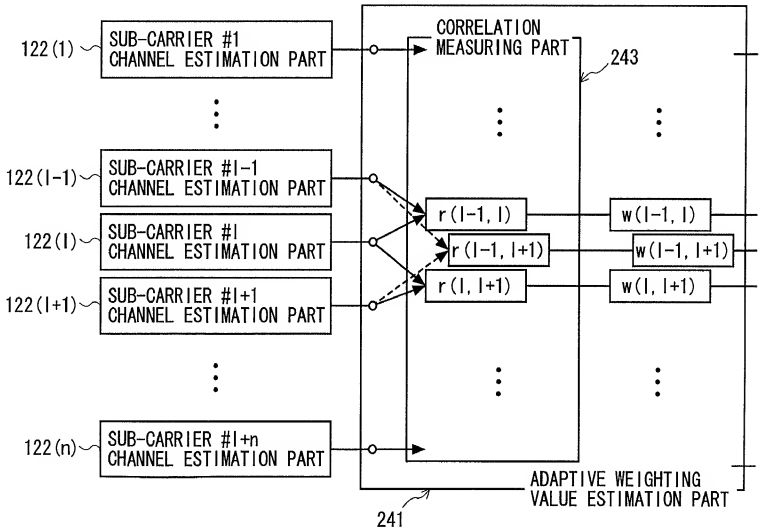
W : WEIGHTING VECTOR
ξ : CHANNEL ESTIMATION VALUES OBTAINED FROM RESPECTIVE SUB-CARRIERS
$\langle \xi \rangle$: CHANNEL ESTIMATION VALUES FOR RESPECTIVE SUB-CARRIERS OBTAINED THROUGH WEIGHTING AVERAGING

FIG.23


242
122(1)
SUB-CARRIER #1 CHANNEL ESTIMATION PART
122(I-1)
SUB-CARRIER #I-1 CHANNEL ESTIMATION PART
122(I)
SUB-CARRIER #I CHANNEL ESTIMATION PART
122(I+1)
SUB-CARRIER #I+1 CHANNEL ESTIMATION PART
122(n)
SUB-CARRIER #n CHANNEL ESTIMATION PART
WEIGHTING AVERAGING CHANNEL ESTIMATION PART
ADAPTIVE WEIGHTING VALUE ESTIMATION PART
241

TOSTEO' TOSOBZ60

FIG.24



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